OPeNDAP OGC Gateway In Support Of Regional IOOS

The project objective is to provide automated capabilities to serve data via OGC interfaces from OPeNDAP.
• Many of the regional IOOS data providers are already providing OPeNDAP services (either with OPeNDAP software or other software).
• Layering primary IOOS services through the existing OPeNDAP infrastructure will allow for quicker adoption and deployment of these services within the community.
• Automation component is critical for deployment and long-term maintenance.

Current Status:
•*Semantics*: Migrating from standalone perl/Sesame app to a Hyrax handler based on Java/Sesame to provide automated Coverage catalog generation at server startup. Added 'rdf' response to Hyrax and enhancements (new versions) of the DDX in support of the RDF activities.

• *NcML handler* developed for Hyrax to augment data sources for CF-compliance where necessary for semantic mapping to WCS.

• *NetCDF File-Out* response for WCS coverage payload generation complete.

• *Aggregation* development underway.

SEMANTIC APPROACH

DAP – Hyrax Extensions
• DDX extended: Support for namespaces with attributes and types; Carry arbitrary XML.
• Hyrax extended: RDF response (generated via XSLT).

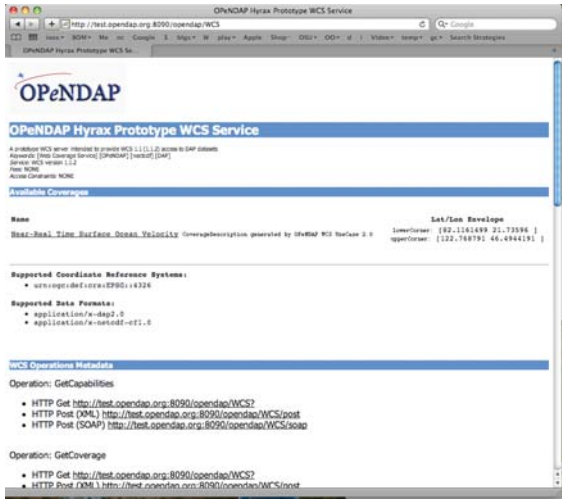
Semantics
• Ontologies for DAP, NetCDF, CF-1.0 and WCS defined in OWL/RDF.
• OWL Rules for mapping between conventions described by the ontologies.

WCS
• Software to use XSLT to convert WCS schema into OWL/RDF.

Inferencing Operations
• Load RDF Triple Store with ontologies and rules for mapping between conventions, RDF describing WCS schema, and the site's DAP data sources (DDX -> RDF response).
• Inferencing happens as RDF is ingested into the triple store, executing rules that generate WCS metadata from CF-1.0 DAP data sources.
• Resulting triple store is queried to return WCS coverage descriptions for CF-1.0 DAP data sources. (represents the catalog of coverages available for that site).
• Inferencing operations occur at site startup, or via cache negotiation or site management.

Prototype Hyrax WCS Service

http://test.opendap.org:8090/opendap/WCS



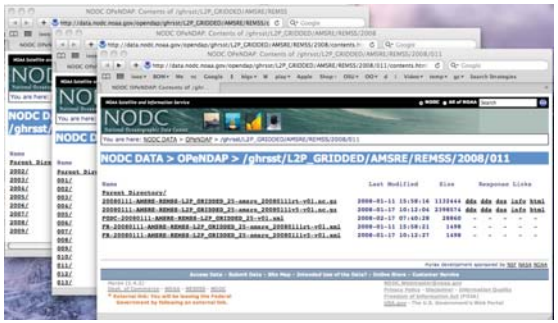
MILESTONES AND CHALLENGES

Milestones
• Prototype WCS service based on static catalogs complete.
• NcML handler for adding missing metadata components in beta.
• RDF version of the DDX produced.
• Ontological mappings between DAP, NetCDF, CF-1.0 and WCS functional.
• Successfully querying semantic engine for WCS components generated from DAP DDX metadata.

Challenges
• Automation – To be useful to an audience beyond a single site a large degree of automation is required in the discovery and exposure of DAP data sets through the OGC service interfaces. This has and will continue to present significant challenges for WCS. SOS is particularly difficult in this regard due to the lack of concretely defined models within the specification.

NEXT STEPS/ RECOMMENDATIONS

- Interfacing the semantics code into the OLFS and Hyrax,
- Aggregation, and testing the resulting WCS.
- Concerning recommendations, determine viability for SOS from OPeNDAP.
- Possible Relational Database Handler for Hyrax in support of SOS.



Why aggregation matters:

- Many sites (like NODC) serve hundreds, if not thousands of files that in truth represent a single WCS coverage.

- The individual granules differ only by a single component variable (such as time).